

REMARKS

Amendments to the specification have been made to correct a number of typographical errors in the application as originally filed.

In response to Examiner rejections, Claims 17 and 55 are hereby cancelled without prejudice, Claims 12-14, 16, 18-25, 34, and 45 are hereby amended, and Claims 106-136 are hereby newly presented. Claims 56-86 drawn to a non-elected invention are hereby cancelled without prejudice, while Claims 1-11, 26-33, 36-44, and 87-105 drawn to a non-elected species are currently withdrawn from consideration. Claims 12-16, 18-25, 34-35, 45-54, and 106-136 are currently pending and under consideration. Reexamination and reconsideration of the application, as amended, are respectfully requested.

Examiner has rejected Claims 17 and 55 under 35 USC §112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The rejection is moot, since Claims 17 and 55 have been cancelled without prejudice. No admission of unpatentability is intended nor should such an admission be inferred.

Examiner has rejected Claims 12-20, 23-25, 34-35, and 45-55 under 35 USC §102(b) as being anticipated by George (US4834474), and has rejected Claims 21-22 under 35 USC §103 as being unpatentable over George.

The rejections are overcome since it is believed that Claims 12-16, 18-25, 34-35, 45-54, and 106-136, as presented herein, patentably distinguish over George.

Regarding Claims 12, 34, 45, and 134, Examiner has asserted that George discloses (Figs. 1b, 2b, and 4b; column 2 lines 47-65 and column 5 lines 22-41) a volume hologram comprising a plurality of diffractive elements. Applicant respectfully disagrees. From page 9 line 23 through page 10 line 10 of the specification (the first paragraph of the Detailed Description), Applicant has acted as his own lexicographer and very explicitly set forth a definition for the term "volume hologram". As set forth in the specification, a volume hologram

is a diffractive structure operative to generate output optical signals in response to input optical signals, wherein each portion of the wavefront of the input signal contributes to the output signal by scattering from the diffractive structure **as it propagates through the structure over a distance large enough so that retardation effects within the diffractive structure significantly influence the form of the output signal.** (emphasis added)

The “volume transmission holographic element” 12 of Figs. 1b, 2b, and 4b of George does not meet this definition, despite the use of the words “volume” and “holographic”. The element 12 of George acts as a diffraction grating, and has a curved surface. Input signals are diffracted and redirected upon transmission through and/or reflection from the diffraction grating. However, retardation effects **within** the diffractive structure have **no influence** on the form of the output signal. There are in fact no such retardation effects within any diffractive structure disclosed by George. In the George patent, the temporal form of the output signal arises from position- and/or wavelength-dependent differences in propagation distance **outside** the diffractive structure. Accordingly, George discloses no element that meets the definition set forth in the specification for a “volume hologram”. Since this element of Claims 12, 34, 45, and 134 is not disclosed by George, Applicant respectfully submits a rejection under 35 USC §102 is improper. Since there is no suggestion or motivation in George for using a structure meeting the definition of “volume hologram”, Applicant respectfully submits any rejection under 35 USC §103 in view of George would also be improper.

Regarding Claims 14 and 15, Examiner asserts that George teaches the use of optical waveguides for the respective input and output optical signals (column 10 lines 17-27). Applicant respectfully disagrees. Beginning at column 10 line 19, George states, “The input pulses arrive from an optical fiber and are **collimated**, for example, by a gradient index rod lens or other suitable lens.” (emphasis added) Claim 14 very specifically recites that the spatial wavefront originates from the input waveguide, and is the same spatial wavefront of the optical signal that interacts with the volume hologram. According to George, the spatial wavefront emanating from the optical fiber is not the spatial wavefront of the signal that interacts with the diffractive structure. The wavefront

is altered by a lens (i.e., collimated) before interaction with the diffractive structure. George does not disclose the use of an output waveguide at all. Since elements and/or limitations of Claims 14 and 15 are not disclosed by George, Applicant respectfully submits a rejection under 35 USC §102 is improper. Since there is no suggestion or motivation in George for employing elements and/or limitations of Claims 14 and 15, Applicant respectfully submits any rejection under 35 USC §103 in view of George would also be improper.

Regarding Claims 16 and 54, Examiner has asserted that an “optical waveform cross-correlator is disclosed by George (column 2 lines 47-65 and column 5 lines 22-41)”. Applicant respectfully disagrees. Applicant is unable to locate the words “cross” or “correlator” in the cited text, or anywhere else in the George patent. Applicant is further unable to locate any description of an apparatus that meets the description of an “optical waveform cross-correlator” in the George patent. Since elements and/or limitations of Claims 16 and 54 are not disclosed by George, Applicant respectfully submits a rejection under 35 USC §102 is improper. Since there is no suggestion or motivation in George for employing elements and/or limitations of Claims 16 and 54, Applicant respectfully submits any rejection under 35 USC §103 in view of George would also be improper.

Regarding Claims 18-20 and 24-25, Examiner has asserted that George discloses diffractive element contours that are circular, concentric, elliptical, and/or confocal (Figs. 1b, 2b, and 4b; column 6 lines 30-55 and column 10 lines 17-27). Applicant respectfully disagrees. The views in the Figures cited by the Examiner show the diffractive elements end-on, and therefore reveal nothing of the shape of the corresponding contours. The cited text, in fact the entire George patent, is silent as to the shape of the contours of the diffractive elements, other than to disclose sets of parallel straight lines. Nowhere in the George patent is there any disclosure of diffractive element contours that are circular, elliptical, concentric, or confocal. Since elements and/or limitations of Claims 18-20 and 24-25 are not disclosed by George, Applicant respectfully submits a rejection under 35 USC §102 is improper. Since there is no suggestion or motivation in George for employing elements and/or limitations of Claims 18-20 and 24-25, Applicant respectfully submits any rejection under 35 USC §103 in view of George would also be improper.

Regarding Claims 106-107, 111-112, 116-117, 122-123, and 135-136, George does not disclose each portion of the output temporal waveform or output optical spectrum including contributions from a plurality of portions of the input spatial wavefront. Nor does George disclose each portion of the output spatial wavefront contributing to a plurality of portions of the output temporal waveform or output optical spectrum. Since elements and/or limitations of the claims in question are not disclosed in George, any rejection under 35 USC §102 would be improper. The claimed limitations are inherent in the claimed invention, and a fundamental difference between the claimed invention and the disclosure of George. As clearly indicated in George (Figs. 1a/1b, 2a/2b, and 4a/4b, for example, and others), the devices disclosed therein operate by division of the input spatial wavefront and differing propagation distances for the divided spatial wavefront portions (the differing propagation distances being outside the “volume transmission holographic element”). Each portion of the input spatial wavefront is mapped by the device of George onto only a single corresponding portion of the output temporal waveform. In stark contrast, there is no such division of the input spatial wavefront in the claimed invention. Each portion of the input spatial wavefront incident on the volume hologram so as to contribute to the output spatial wavefront contributes to multiple portions of the output temporal waveform, and each portion of the output temporal waveform includes contributions from multiple portions of the output spatial wavefront. Since there is no suggestion or motivation for such operation in George, Applicant respectfully submits any rejection under 35 USC §103 in view of George would be improper.

Regarding Claims 106-133, George does not disclose a volume hologram residing within a planar optical waveguide, nor does George disclose interaction of the input signal with the volume hologram while the input signal propagates within the planar waveguide, the propagation of the input optical signal within the planar waveguide being substantially guided in at least one dimension by the planar waveguide. Since elements and/or limitations of Claims 106-133 are not disclosed by George, Applicant respectfully submits any rejection under 35 USC §102 would be improper. Since there is no suggestion or motivation in George for employing elements and/or limitations of Claims 106-133, Applicant respectfully submits any rejection under 35 USC §103 in view of George would also be improper.

Newly presented Claims 134-136 are believed to be generic to elected Species 2 and non-elected Species 1, 3, and 4 of elected Group I. Claims 12-16, 18-25, 34-35, 45-54, and 106-133 are drawn to elected Species 2. In the event that one or more of Claims 134-136 is held allowable, Applicant respectfully requests reinstatement and allowance of Claims 1-11, 26-33, and 36-44 (Species 1), Claims 87-103 (Species 3), and Claims 104-105 (Species 4).

In view of the above, Applicant respectfully submits that Claims 12-16, 18-25, 34-35, 45-54, and 106-136 are in condition for allowance. Reconsideration of the rejections is respectfully requested. Allowance of Claims 12-16, 18-25, 34-35, 45-54, and 106-136, and reinstatement and allowance of Claims 1-11, 26-33, 36-44, and 87-105, are earnestly solicited.

Respectfully submitted,

N. G. H.